USPTO
Fax: 571 273 5540 (4 pages)
**Attn. Narayan Bhat**

16 June 2009

**Re: informal response to final action for application 10/566482 in preparation for teleconference**

Dear Mr Bhat,

As discussed on the phone a few days ago, would you please carefully consider the information provided below in preparation for our phone conference.

My comments will deal with the Claim Rejections part of the final action i.e. items 17, 18 etc.

1. In section 17 it is concluded that it would be obvious *to modify the optical means of detection of Obremski et al with the monolithic integration of optical means at the binding site of Duveneck et al with a reasonable expectation of success with the expected benefit of providing higher signal stability without any background interfering signals as taught by Duvenck et al (column 4, lines 2-12).*

Let us analyze this statement in detail.

I agree that Obremski et al teach all the components of the monolithically integrated biochip of the present invention but in the form of discrete components assembled together.

Then it needs to be established whether Duveneck et al indeed propose <u>monolithic</u> integration of all the above components.

What Duveneck teach regarding possibility of integration within the framework of his invention is this (column 3, line 66 onwards):

*Furthermore, both the light source and the detector can be integrated into the sensor platform in question or it is possible to use a sandwich consisting of the sensor platform according to the invention and a complimentary excitation and detection chip so that higher signal stability can be achieved.* And later talking about the same sensor platform sandwich *...there is no interfering signal caused by the absorption of light ...*

I would like to bring your attention to two points from the above extract.

First is that there is no mentioning of the word monolithic when taking about possible integration.

Second, and this is of primary importance, Duveneck at al. suggest to use a sandwich of two separate chips (one the sensor platform chip and the other is a complimentary excitation and detection chip and it is in this configuration that the advantages of the higher signal stability and low background interfering signals are achieved.

I note that since the two separate chips are mentioned this clearly not a monolithic integration where all components should be integrated in one chip manufactured by processing one substrate.

Therefore, the concluding statement of 17 is incorrect, namely Duveneck does not propose monolithic integration in order to achieve higher signal stability and lower background noise.

It should be noted that the main purpose of the present invention is to propose a low cost disposable biochip that can be produced in volume (paragraph 0013) and not necessarily a biochip with superior performance.

2. The following statement is made in section 17 regarding first and second waveguide of the present invention: *Duveneck at al explicitly teaches that the first planar waveguide and second planar waveguide separated by coupling layer (column 7, lines 11-16).*

Column 7, lines 11-16 of Duveneck recites as follows: *The support material may consist, for example, of a composite system of different materials, for example a layered system on a support plate or the like. In that case only the refractive index of the material directly adjacent to the waveguiding layer needs to be lower than the refractive index of the waveguiding layer.*

What this statement means in physical terms is that any substrate can be used as long as the layer in direct contact with the waveguiding layer is of lower refractive index. There is nothing more that can be reasonable inferred from this statement. There is no mentioning of the second waveguide in this statement.

Therefore the conclusion in 17 as to Duveneck explicitly teaching first and second waveguides is unsubstantiated.

3. The concluding statement of section 18 reads that it would be *obvious to modify the optical means of Obremski et al with the thin film semiconductor optical means of Sickmiller with a reasonable expectation of success with the expected benefit of having a thin film semiconductor with mechanical flexibility, increasing optical*

*efficiency and electrical performances as taught by Sickmiller (column 9, lines 49-56).*

In regard of the above statement it should be noted that Sickmiller does not teach thin film semiconductor layer of the present invention.

Sickmiller teaches a semiconductor layer grown on a semiconductor substrate and subsequently separated from it.

This is different from the thin film semiconductor of the present invention that is grown on low cost non-semiconductor substrate for the purposes of achieving cost advantage (0020 of present specification).

Therefore, the thin film semiconductor of Sickmiller does not fit the definition of the thin film semiconductor of the present and the concluding statement of section 18 is incorrect.

The statement that *Sickmiller also teaches polymer semiconductor thin film material comprise polymer (column 2, line 9)* is also without substance.

In column 2 line 9 of Sickmiller the polymer is suggested only as support layer for thin film semiconductor grown on semiconductor substrate and not as semiconductor polymer as such.

4. The concluding statement of section 19 reads that it would be obvious *to modify the light source and photodetector of Obremski et al. and Sickmiller with thin film microcavity light source and detector of Little et al with reasonable expectation of success with the expected benefit of having microcavity light source and photodetector providing means for efficient optical detection at the microlocations on the substrate and enhancing the detection sensitivity as taught by Little at al (paragraphs 0013 and 0035)*

Considering the above extract, Little at al does not teach microcavity light source and detector. The examiner makes a mistake in assuming that the resonant cavity light source and detector of Little et all are the same as microcavity light sources and detectors of the present invention.

In paragraph 0034 of Little it is stated that resonant cavity employed in his invention is 1-2 microns.

In the present specification the microcavity is defined as having dimension of half the wavelength of light to be emitted or received (paragraph 0023), which makes it 0.15-0.3 microns which is roughly ten times less than the resonant cavity employed by Little. In one practical example given in the current specification the size of microcavity is 0.15 micron (paragraph 0078).

The use of microcavity as opposed to resonant cavity allows for better utilization of materials and makes the biochip of the present invention better suitable for low cost mass production.

Therefore, the resonant cavity of Little is different from microcavity of the present invention and the concluding statement of section 19 is incorrect.

5. The concluding statement of section 20 states that it would be obvious *to modify the substrate of Obremski et al and Duveneck et al with the substrate comprising electrode of McFarland et al with a reasonable expectation of success with the expected benefit of having heat resistive electrodes for generation addressable arrays of compounds varying in composition, concentration stoichiometry and thickness and for controlling reaction and hybridization as taught by McFarland et al (paragraphs 0010 and 0011).*

The electrodes of the present invention are different from the electrodes of McFarland. The electrodes of the present invention are located at the binding sites for the purpose of controlling hybridization conditions at the sites, whereas the electrodes of McFarland are located at the deposition sites to control deposition (0064).

The meaning of word hybridization is totally different: in McFarland it means a merger of two embodiments of his method and not hybridization of the present specification, which is the reaction between probe molecules and the biological substance under test (paragraph 0005).

McFarland also teaches resistive electrodes for creating a spatial field distribution and not resistive heater electrodes for controlling temperature.

The word heating in McFarland is used to refer to heating of the whole substrate during deposition process and not by means of resistive electrodes.

6. There seems to be quite a bit of confusion on the examiner's part in interpreting relatively simple technical terms resulting in references to the alleged prior art, which, at a closer examination, should have been found irrelevant.

I hope that the teleconference will help to resolve these issues and look forward to hear from you as to a suggested day/time for it as soon as practical.

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Best regards,
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